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Full title: The contribution of Dutch doctors global health and tropical medicine to research in global health in low- and middle-income countries: an exploration of the evidence

Short title: Impact of expatriate doctors' research

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Keywords: global health, tropical medicine, research, bibliometrics

Abstract

Most medical research is conducted in high-income countries and results may not apply to low- and middle-income countries. Some expatriate physicians combine clinical duties with research. We present global health research conducted by Dutch medical doctors Global Health and Tropical Medicine in low- and middle-income countries and explore the value of their research.

We included all research conducted in the last 30 years by medical doctors Global Health and Tropical Medicine in a low- and middle-income country, resulting in a PhD thesis. Articles and co-authors were found through Medline. More than half of the 18 identified PhD theses concerned maternal health and obstetrics, and the majority of the research was conducted in low-income countries, mostly in rural hospitals. Over 70 local co-authors were involved. Different aspects of these studies are discussed.

Introduction

Most medical scientific research is conducted in high-income countries (HICs).[1, 2] Evidence from these studies needs to be appropriately interpreted.[3] Some conclusions are universally applicable, but external validity depends on the setting. This means that insights from research in HICs often need local validation elsewhere. Even though attention to conducting research in low- and middle-income countries (LMICs) is increasing, it is still not a priority.[1, 4-6] Several expatriate physicians from HICs fill some of the gaps in human resources for health in LMIC.[7, 8] In addition to their clinical, managerial and teaching responsibilities, many expatriate physicians also conduct medical scientific research, generally aiming to improve the local quality of care, and less so, to contribute to advances in medical knowledge, experience and practice. Because of the growing attention in regard to health research capacity in LMICs in recent years,[1, 4, 9] including the role of local co-authors[6, 10] we will elaborate on the added value of studies of expatriate physicians.

In this paper we studied Dutch expatriate physicians, specifically medical doctors in Global Health and Tropical medicine (MDs GHTM, see Box 1), to explore the contribution of this group of experts in building an evidence base relevant to LMICs. To include a clearly defined group of research and to include only larger projects, we focused on research resulting in a PhD thesis.

Box 1: Dutch medical doctors in Global Health and Tropical Medicine and the Netherlands Society for Tropical Medicine and International Health[11]

In 1907 a small group of medical doctors founded the Netherlands Society for Tropical Medicine and International Health **(**NVTG) originally focusing on improving health care in (former) colonies – countries now classified as LMICs (www.ntvg.org). Since the late 1960s, the NVTG has offered a training programme for MDs with ambitions to work in LMICs, with a focus on clinical practice and strengthening of health systems. The previously named 'Tropical doctor training programme' has evolved to the current training of two clinical terms (9-12 months) in obstetrics and gynaecology, surgery, or paediatrics; a course (three months) on Global Health and Tropical Medicine; and a clinical term (six months) in an LMIC. Around 20-30 such Dutch MDs GHTM graduate each year. Typically, these doctors work for a few years in a remote setting in an LMIC, responsible for clinical tasks, as well as teaching, supervision, and management.

Methods

Our inclusion criteria were: PhD theses published by an MD GHTM (see Box 1), conducted between 1988-2018, while clinically working in an LMIC, as defined by the World Bank Country Classification (https://datahelpdesk.worldbank.org/knowledgebase/articles/906519). Eligible theses were identified using repositories of Dutch universities, the archives of the NVTG (see Box 1) and the archives of the Working Party International Safe Motherhood and International Reproductive health (www.safemotherhood.nl). Other working parties and sections of the NVTG were contacted at an annual conference and by contacting key-informants for further information.

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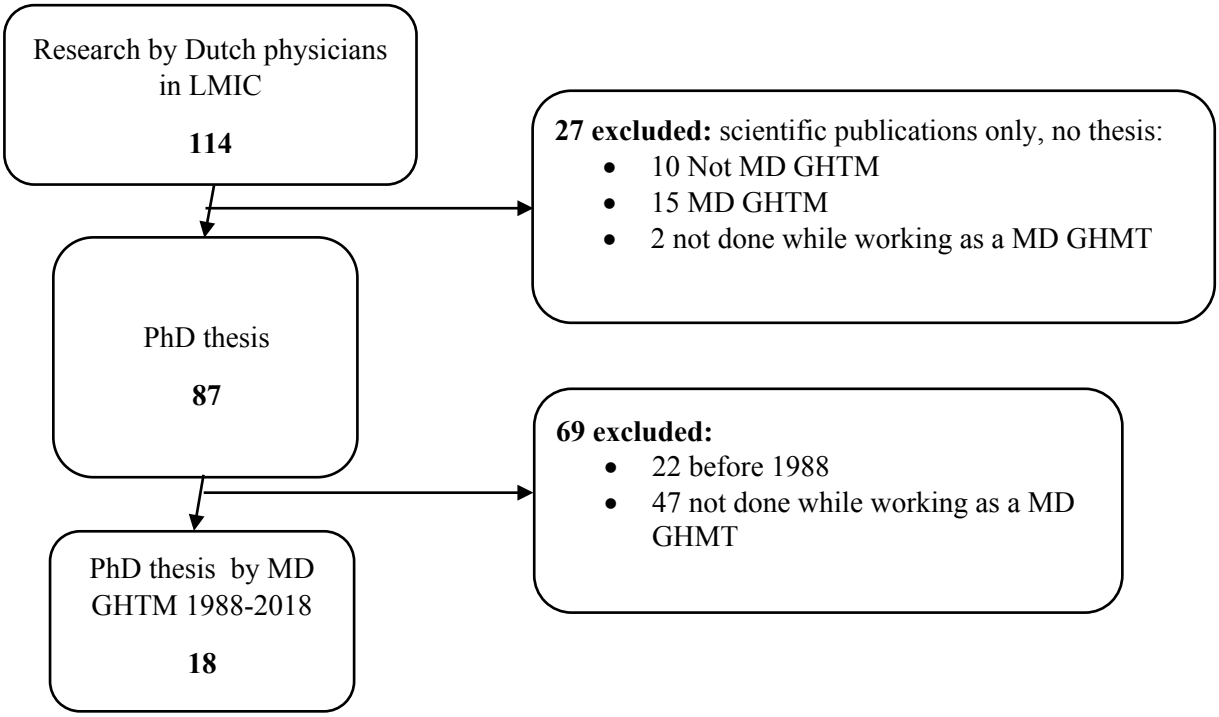
Results

The work of a total number of 114 researchers was reviewed for eligibility (Figure 1).

Figure 1: flowchart selection research



Eighteen MDs GHTM published a thesis that met the inclusion criteria (Table 1). Eighteen theses were completely available, either in print or electronic. Most (10) studies were in the field of maternal health and obstetrics, some of those being part of the Safe Motherhood series of PhD theses (https://safemotherhood.nl/publicaties-safe-motherood-serie/).[12-20] Studies were conducted in five low-income, three lower middle-income and two upper-middle-income countries. The 18 theses resulted in 125 Medline-indexed articles, which were co-authored by more than 70 local colleagues.

Table 1: theses

Year	Country	Title	Topic	Setting	Medline entries	Local authors
1988[21]	Tanzania	Maternal health care in South Western highlands Tanzania	Maternal health care	2 rural hospitals in Tanzania	6	0
1988[22]	Tanzania	Nutrition rehabilitation in the Southwestern highlands of Tanzania: A two-way learning process	Nutrition in children	Rural district and hospital in Tanzania	3	1
1995[12]	Tanzania	Perinatal assessment in rural Tanzania	Perinatal outcomes	1 hospital and 5 villages in a rural area in Tanzania	9	1
1999[23]	Zambia	Childhood malnutrition in rural Zambia	Childhood malnutrition	Rural district hospital in Zambia	5	0
2003[13]	Ghana	Reproductive health matters in rural Ghana	Reproductive health	Rural district., 2 district hospitals in Ghana	8	6
2003[24]	Kenya	Anemia in adolescent schoolgirls in Western Kenya	Anaemia in adolescents	3 rural hospitals in Kenya	4	3
2004[14]	Zimbabwe	Vaginal birth after caesarean section in Zimbabwe and the Netherlands	Birth after Caesarean Section	Hospitals and maternity waiting home in a rural	4	0

Year	Country	Title	Topic	Setting	Medline entries	Local authors
				district in Zimbabwe		
2004[15]	Zambia	Health care seeking behaviour and utilisation of health services in Kalabo District, Zambia	Health-care seeking behaviour	Rural community, district hospital in Zambia	6	3
2007[25]	Zambia	The role of delayed umbilical cord clamping to control infant anaemia in resource-poor settings	Umbilical cord clamping	Rural hospital in Zambia and urban hospital in Libya	8	1
2009[16]	Namibia	Obstetric audit in Namibia and the Netherlands	Obstetric audit	Semi-rural hospital in Namibia	8	0
2011[17]	Malawi and Zambia	Delay in safe motherhood	Delay in safe motherhood	Rural hospital in Zambia and district hospital in Malawi	6	1
2012[26]	Thailand	Susceptibility to malaria with a focus on the postpartum period	Malaria post-partum	Rural antenatal clinics in Thailand	6	10

Year	Country	Title	Topic	Setting	Medline entries	Local authors
2012[27]	Thailand	Malaria in pregnancy: ultrasound studies of fetal growth	Malaria in pregnancy	Refugee and migrant clinics on the Thai Burmese border	9	12
2012[18]	Malawi	Medical mirrors – maternal care in a Malawian district	Maternal health care	District hospital in rural Malawi	11	13
2013[19]	Malawi	Health professionals and maternal health in Malawi: mortality and morbidity at district level	Maternal health professionals	District hospital in rural Malawi	5	5
2013[28]	Sierra Leone and Rwanda	Surgical Need & Capacity in Low and Middle Income Countries	Surgical need and capacity	Population - based surveys and hospital-based studies in Sierra Leone and Rwanda	11	9
2013[20]	Tanzania	Improving maternal outcome in rural Tanzania using obstetric simulation-based training	Training in obstetrics	District hospital in Tanzania	5	1
2015[29]	Kenya	Cardiovascular disease prevention in the slums of Kenya	Cardiovascular disease prevention	Population -based	11	8

Year	Country	Title	Topic	Setting	Medline entries	Local authors
				studies in Nairobi		

Discussion

Our search identified 18 theses successfully defended in the past 30 years by MDs GHTM in LMICs which resulted in the approval of a doctorate. Differences depending on setting have been identified.

Studies in LMICs are usually conducted in academic settings and dissemination of the results is limited, which results in a knowledge gap in non-academic hospitals. In LMICs, differences between small hospitals and large tertiary centres can be substantial. Additionally, rural hospitals serve a different population. This means that the clinical reality in small rural hospitals in LMICs can be very different from the evidence base and that research from these hospitals is important to create local evidence and improve clinical practice. Unfortunately, for the reasons mentioned above, these results again cannot be easily generalised. It is important that settings are comparable when results are used in a different setting.

Most MDs GHTM whose research was included in this study, were posted in rural district hospitals. Hence, they were in a good position to conduct research to fill the knowledge gap in non-academic settings in LMICs. Typically, they stayed in these hospitals for a longer period

(often three years), which allowed them to understand the local setting, (public) health specifics and to identify local research needs. Most doctors included in our study were supported by supervisors and funders in their country of origin. They were able to establish local research partnerships, make a locally relevant research plan and complete this. Methodology, statistics and evidence-based medicine are part of the training of Dutch MD training, and the GHTM programme contains specific course-material on qualitative research methods and research in LMICs. This is useful when working together with local doctors and non-physicians with less experience in conducting research.

In most of the included studies, local health care workers also collaborated resulting, in co-authorship. Our results show over 90 local participants, many of whom had no experience in research. It is hoped, that these local health workers were enthused about using scientific research to evaluate and improve their clinical practice. In this way, expatriate physicians might have contributed to sustainable medical research capacity building,[1, 30, 31] acting as research mentors.[32] Further research might look into this in more depth. Some of the research, mostly recent, was started by local research institutions and involved a large number of local field researchers.[19, 26-29] As well as encouraging research, involving local co-authors shows authorship parity,[33, 34] and has been advocated as a requirement for HIC researchers publishing studies conducted in LMIC.[10] Local ownership of the studies can be encouraged by answering locally formulated research questions, by involving staff and by direct implementation of the recommendations of the studies. This will lead to improving the quality of care in the hospitals

where the studies were conducted and democratisation of science.[15]

Expatriate physicians with clinical experience in both settings (a HIC as well as an LMIC) provide a good starting point to conduct research, as they have easy access to study populations. Mirror-studies comparing HICs with LMICs, for example on maternal mortality[14-16, 18] prove useful for both settings. The typical outsider perspective can be helpful in audit-studies.[35-37] Qualitative or mixed-methods studies are appropriate types of research when little previous research is done, and new ideas are explored.[38, 39] The expatriate physician appeared to be well suited for implementation research, studying how to implement new techniques, such as best ultrasound scanning techniques, often having worked with these techniques previously in a HIC.[27, 40] This type of research is of lower level evidence than randomized controlled trials and meta-analyses from HICs. However, the relevance of such studies is undisputed, and the results can be immediately used in the local setting to improve quality of care. New knowledge thus generated could in many cases also easily be translated to other low-resource settings. Besides being useful for the setting in which the research is conducted, lessons may be learned for HIC settings. This is especially the case for diseases which are rare in HICs such as malaria and measles in pregnancy,[27, 41] eclampsia and uterine rupture,[36, 42] and procedures such as symphysiotomy,[21] which are more difficult to study in HIC. Some theses have demonstrated a direct improvement of care,[36] and implementation of evidence-based practices, such as audits.[15, 16] The practice of delayed-cord clamping has been adopted into HIC guidelines.[43, 44] About the lasting effects in the local setting after the thesis is completed, less is known.

Challenges cited by MDs GHTM in their theses were concerned with involving local health care workers too busy with clinical duties to engage in research as well as obtaining grants for relatively small studies which may seem redundant for funders without knowledge of LMIC settings. Other problems mentioned were getting local (ethical) clearance and difficulties when expensive tests (sometimes unavailable in LMICs) were needed. Implementing results into practice is a challenge for all research, but was also mentioned.

We have shown that small-scale research in low-resource settings may give useful new insights. It is important that policymakers and funding agents realise that this type of research is important in complementing research of high level of evidence in HICs. This paper shows that some Dutch expatriate physicians extend their role in their clinical field to research and we recommend continuing stimulating research and offering research methodology as a part of their training programme.[45-47]

We purposefully included only research by MDs GHTM resulting in a PhD. Since we only included 18 theses, which is a selection of all research by expatriate physicians, the sample might not be representative in all aspects. However, this group is well described, and for the discussion, we doubt whether a larger sample would change our conclusions. The role of PhD researchers in global health research has been described before.[48]

Conclusion

In the last 30 years, different types of studies in LMICs have been done by MDs GHTM, resulting in 18 PhD theses. Most of the studies are in the field of maternal health and obstetrics, and more than 70 local colleagues were involved as co-authors. Expatriate physicians are in a unique position to conduct scientific research in a low- and middle-income setting, in addition to their clinical and other tasks. This is of added value to the setting where the research is done, as a way of quality improvement and by building research capacity in remote areas. The country of origin of the expatriate physician benefits, as well as the physicians themselves.

Abbreviations

HIC: High-income Country; LMIC: Low- or Middle-income country; MD GHTM: Medical doctor Global Health and Tropical Medicine; NVTG: Netherlands Society for Tropical Medicine and International Health.

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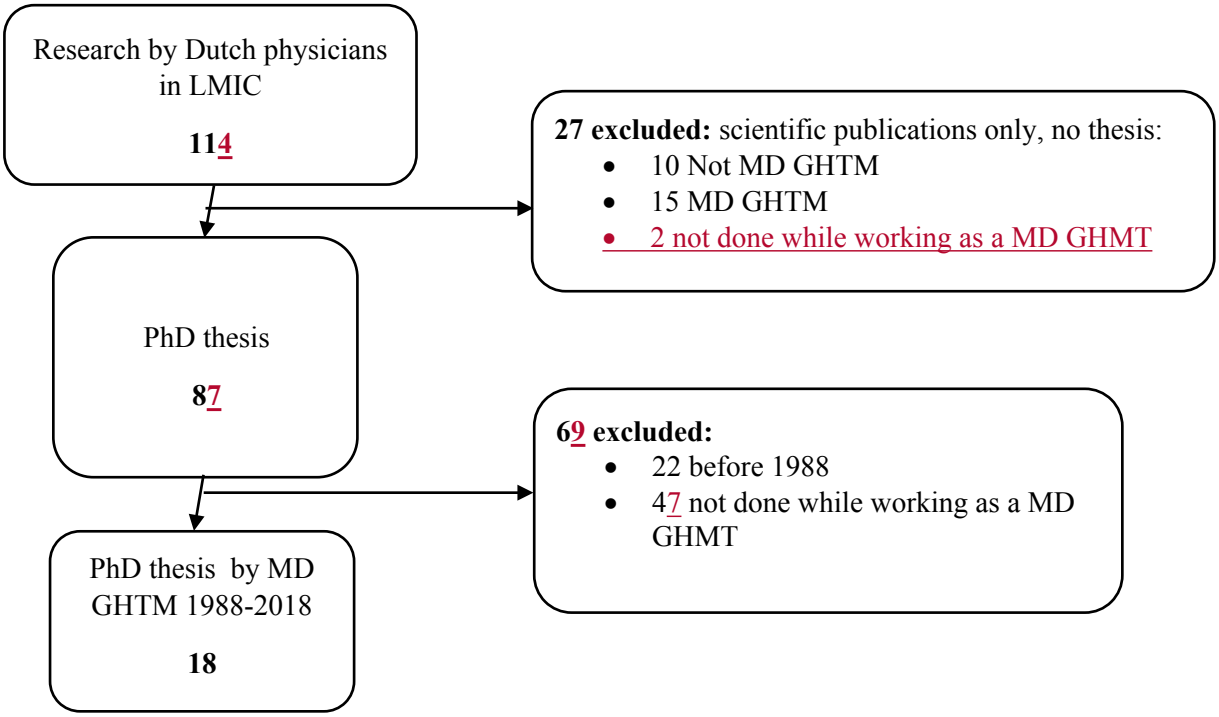
Figure 1: flowchart selection research



Eighteen MDs GHTM published a thesis that met the inclusion criteria (Table 1). Eighteen theses were completely available, either in print or electronic. Most (10) studies were in the field of maternal health and obstetrics, some of those being part of the Safe Motherhood series of PhD theses (https://safemotherhood.nl/publicaties-safe-motherood-serie/).[12-20] Studies were conducted in five low-income, three lower middle-income and two upper-middle-income countries. The 18 theses resulted in 125 Medline-indexed articles, which were co-authored by more than 70 local colleagues.

Table 1: theses

Year	Country	Title	Topic	Setting	Medline entries	Local authors
1988[21]	Tanzania	Maternal health care in South Western highlands Tanzania	Maternal health care	2 rural hospitals in Tanzania	6	0
1988[22]	Tanzania	Nutrition rehabilitation in the Southwestern highlands of Tanzania: A two-way learning process	Nutrition in children	Rural district and hospital in Tanzania	3	1
1995[12]	Tanzania	Perinatal assessment in rural Tanzania	Perinatal outcomes	1 hospital and 5 villages in a rural area in Tanzania	9	1
1999[23]	Zambia	Childhood malnutrition in rural Zambia	Childhood malnutrition	Rural district hospital in Zambia	5	0
2003[13]	Ghana	Reproductive health matters in rural Ghana	Reproductive health	Rural district., 2 district hospitals in Ghana	8	6
2003[24]	Kenya	Anemia in adolescent schoolgirls in Western Kenya	Anaemia in adolescents	3 rural hospitals in Kenya	4	3
2004[14]	Zimbabwe	Vaginal birth after caesarean section in Zimbabwe and the Netherlands	Birth after Caesarean Section	Hospitals and maternity waiting home in a rural	4	0

Year	Country	Title	Topic	Setting	Medline entries	Local authors
				district in Zimbabwe		
2004[15]	Zambia	Health care seeking behaviour and utilisation of health services in Kalabo District, Zambia	Health-care seeking behaviour	Rural community, district hospital in Zambia	6	3
2007[25]	Zambia	The role of delayed umbilical cord clamping to control infant anaemia in resource-poor settings	Umbilical cord clamping	Rural hospital in Zambia and urban hospital in Libya	8	1
2009[16]	Namibia	Obstetric audit in Namibia and the Netherlands	Obstetric audit	Semi-rural hospital in Namibia	8	0
2011[17]	Malawi and Zambia	Delay in safe motherhood	Delay in safe motherhood	Rural hospital in Zambia and district hospital in Malawi	6	1
2012[26]	Thailand	Susceptibility to malaria with a focus on the postpartum period	Malaria post-partum	Rural antenatal clinics in Thailand	6	10

Year	Country	Title	Topic	Setting	Medline entries	Local authors
2012[27]	Thailand	Malaria in pregnancy: ultrasound studies of fetal growth	Malaria in pregnancy	Refugee and migrant clinics on the Thai Burmese border	9	12
2012[18]	Malawi	Medical mirrors – maternal care in a Malawian district	Maternal health care	District hospital in rural Malawi	11	13
2013[19]	Malawi	Health professionals and maternal health in Malawi: mortality and morbidity at district level	Maternal health professionals	District hospital in rural Malawi	5	5
2013[28]	Sierra Leone and Rwanda	Surgical Need & Capacity in Low and Middle Income Countries	Surgical need and capacity	Population - based surveys and hospital-based studies in Sierra Leone and Rwanda	11	9
2013[20]	Tanzania	Improving maternal outcome in rural Tanzania using obstetric simulation-based training	Training in obstetrics	District hospital in Tanzania	5	1
2015[29]	Kenya	Cardiovascular disease prevention in the slums of Kenya	Cardiovascular disease prevention	Population -based	11	8

Year	Country	Title	Topic	Setting	Medline entries	Local authors
				studies in Nairobi		

Discussion

Our search identified 18 theses successfully defended in the past 30 years by MDs GHTM in LMICs which resulted in the approval of a doctorate. Differences depending on setting have been identified.

Studies in LMICs are usually conducted in academic settings and dissemination of the results is limited, which results in a knowledge gap in non-academic hospitals. In LMICs, differences between small hospitals and large tertiary centres can be substantial. Additionally, rural hospitals serve a different population. This means that the clinical reality in small rural hospitals in LMICs can be very different from the evidence base and that research from these hospitals is important to create local evidence and improve clinical practice. Unfortunately, for the reasons mentioned above, these results again cannot be easily generalised. It is important that settings are comparable when results are used in a different setting.

Most MDs GHTM whose research was included in this study, were posted in rural district hospitals. Hence, they were in a good position to conduct research to fill the knowledge gap in non-academic settings in LMICs. Typically, they stayed in these hospitals for a longer period

(often three years), which allowed them to understand the local setting, (public) health specifics and to identify local research needs. Most doctors included in our study were supported by supervisors and funders in their country of origin. They were able to establish local research partnerships, make a locally relevant research plan and complete this. Methodology, statistics and evidence-based medicine are part of the training of Dutch MD training, and the GHTM programme contains specific course-material on qualitative research methods and research in LMICs. This is useful when working together with local doctors and non-physicians with less experience in conducting research.

In most of the included studies, local health care workers also collaborated, resulting in co-authorship. Our results show over 90 local participants, many of whom had no experience in research. It is hoped, that these local health workers were enthused about using scientific research to evaluate and improve their clinical practice. In this way, expatriate physicians might have contributed to sustainable medical research capacity building,[1, 30, 31] acting as research mentors.[32] Further research might look into this in more depth. Some of the research, mostly recent, was started by local research institutions and involved a large number of local field researchers.[19, 26-29] As well as encouraging research, involving local co-authors shows authorship parity,[33, 34] and has been advocated as a requirement for HIC researchers publishing studies conducted in LMIC.[10] Local ownership of the studies can be encouraged by answering locally formulated research questions, by involving staff and by direct implementation of the recommendations of the studies. This will lead to improving the quality of care in the hospitals

where the studies were conducted and democratisation of science.[15]

Expatriate physicians with clinical experience in both settings (a HIC as well as an LMIC) provide a good starting point to conduct research, as they have easy access to study populations. Mirror-studies comparing HICs with LMICs, for example on maternal mortality[14-16, 18] prove useful for both settings. The typical outsider perspective can be helpful in audit-studies.[35-37] Qualitative or mixed-methods studies are appropriate types of research when little previous research is done, and new ideas are explored.[38, 39] The expatriate physician appeared to be well suited for implementation research, studying how to implement new techniques, such as best ultrasound scanning techniques, often having worked with these techniques previously in a HIC.[27, 40] This type of research is of lower level evidence than randomized controlled trials and meta-analyses from HICs. However, the relevance of such studies is undisputed, and the results can be immediately used in the local setting to improve quality of care. New knowledge thus generated could in many cases also easily be translated to other low-resource settings. Besides being useful for the setting in which the research is conducted, lessons may be learned for HIC settings. This is especially the case for diseases which are rare in HICs such as malaria and measles in pregnancy,[27, 41] eclampsia and uterine rupture,[36, 42] and procedures such as symphysiotomy,[21] which are more difficult to study in HIC. Some theses have demonstrated a direct improvement of care,[36] and implementation of evidence-based practices, such as audits.[15, 16] The practice of delayed-cord clamping has been adopted into HIC guidelines.[43, 44] About the lasting effects in the local setting after the thesis is completed, less is known.

Challenges cited by MDs GHTM in their theses were concerned with involving local health care workers too busy with clinical duties to engage in research as well as obtaining grants for relatively small studies which may seem redundant for funders without knowledge of LMIC settings. Other problems mentioned were getting local (ethical) clearance and difficulties when expensive tests (sometimes unavailable in LMICs) were needed. Implementing results into practice is a challenge for all research, but was also mentioned.

We have shown that small-scale research in low-resource settings may give useful new insights. It is important that policy–makers and funding agents realise that this type of research is important in complementing research of high level of evidence in HICs. This paper shows that some Dutch expatriate physicians extend their role in their clinical field to research and we recommend continuing stimulating research and offering research methodology as a part of their training programme.[45-47]

We purposefully included only research by MDs GHTM resulting in a PhD. Since we only included 18 theses, which is a selection of all research by expatriate physicians, the sample might not be representative in all aspects ~~of all research by expat physicians~~. However, this group is well described, and for the discussion, we doubt whether a larger sample would change our conclusions. The role of PhD researchers in global health research has been described before.[48]

Conclusion

In the last 30 years, different types of studies in LMICs have been done by MDs GHTM, resulting in 18 PhD theses. Most of the studies are in the field of maternal health and obstetrics, and more than 70 local colleagues were involved as co-authors. Expatriate physicians are in a unique position to conduct scientific research in a low- and middle-income setting, in addition to their clinical and other tasks. This is of added value to the setting where the research is done, as a way of quality improvement and by building research capacity in remote areas. The country of origin of the expatriate physician benefits, as well as the physicians themselves.

Abbreviations

HIC: High-income Country; LMIC: Low- or Middle-income country; MD GHTM: Medical doctor Global Health and Tropical Medicine; NVTG: Netherlands Society for Tropical Medicine and International Health.

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